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HRG Assessment

SUSE[®] Linux Enterprise Server 10 Service Pack 1 & HP

Virtualization, Consolidation, and Adaptive Infrastructure

Virtualization and Consolidation

Virtualization adoption today is in the early stages and the number of organizations doing Linux Virtualization is between 1 and 2 percent. However, HRG views the virtualization of Linux and Microsoft Windows environments as having a significant long term impact on the way that organizations leverage their IT assets. Server virtualization, cluster virtualization, site virtualization, and enterprise IT / Data Center virtualization each have the potential of delivering real benefits in terms of cost reduction, flexibility, agility, and productivity improvements.

Server **consolidation** is a viable solution for the elimination of server sprawl and under utilized servers. Virtualization can facilitate server consolidation, the more effective use of installed technologies, and eliminate over provisioning of servers. Existing servers can be consolidated on to fewer and in many cases smaller systems due to ongoing increases in CPU power. Take for example the benefits brought to market through the introduction of HP's c-Class and p-Class Blades.

The first release of SUSE Linux Enterprise Server from Novell[®] with virtualization capabilities, was supplied through the integration of the open source Xen hypervisor project into the SUSE Linux Enterprise Server 10 and went to market July 2006. This was a version one release and anyone who has been involved to any extent in software development and product launch will likely say that a version one release while functional is typically not quite ready for full bore bet your business production use. Now with the release of SUSE Linux Enterprise Server 10 SP1 HRG expects to see Novell deliver substantially on the promise of a fully functional virtualized enterprise ready Linux with fully available support for Windows running on Linux or Linux running on Windows. Customers can now look forward to gaining better control of their infrastructure, IT, and HR costs while at the same time driving substantial improvements in productivity and bottom-line business performance.

SUSE Linux Enterprise Server 10 SP1 and Xen virtualization technology helps data center managers treat all the AMD and Intel hardware and Novell and certified ISV software in the datacenter as a pool of interchangeable resource components. In effect, the technology now exists to dynamically bring together what is needed, when it is needed, delivering the capabilities of a truly **adaptive infrastructure** at a pace and in ways that make excellent business sense.

Xen, which provides the SUSE Linux Enterprise Server 10 SP1 virtualization capabilities has been endorsed and adopted by many of the industry's leading vendors including AMD, Dell, Hewlett-Packard, IBM, Intel, Novell, Red Hat and Sun Microsystems. SUSE Linux Enterprise Server 10 is the first operating system to offer integrated virtualization with Xen giving Novell more than a one year head start on their nearest competition. This lead in accrued experience and expertise with Xen and Virtualization gives Novell a competitive advantage and positions them as the "go-to" company for anyone who is seriously considering server and data center virtualization. Xen has been included in RHEL 5 occurring more than a full year after Novell first announced the integration of Xen with SUSE Linux Enterprise Server 10 in 2006. As server virtualization advances HP and Novell are evaluating the business case to qualify SUSE Linux Enterprise Server for Itanium for HP's Integrity line of servers. Today the HP Integrity Virtual Machine provides support for SUSE Linux Enterprise Server 10 as a guest operating system.

Xen hypervisor (Virtual Machine Monitor - VMM) provides virtual machine functionality and once VMM has loaded, the Xen Virtual Machine (VM) Server is loaded to create and control the other VMs and communicate with the server hardware. A VM is a guest domain that may or may not know it is running in a VM, depending on whether it is para-virtualized or fully-virtualized. A VM in essence thinks it is running on its own physical hardware. In reality it is running on a piece of software called a hypervisor or Virtual Machine Monitor (VMM) presenting each system image with a virtualized view of its own native hardware and operating system.

Virtualization can increase the utilization of existing compute resources and facilitate the reprovisioning of new servers as needed at a lower TCO. Virtualization when properly implemented results in a significant improvement in organizational flexibility, agility, and adaptability to enhance the organizations ability to adapt quickly to continuously changing highly competitive business environments. Consolidation through virtualization will significantly reduce environmental conditioning requirements such as cooling, power, systems administration, and required square footage - floor space. When virtualization is effectively implemented it is possible to consolidate in some cases by a factor of as much as 12 to 1 meaning that you can now consolidate 12 physical servers onto a single server running 12 VMs for significant savings in people, infrastructure, and equipment costs. Other benefits of virtualization include increased resource efficiency, reductions in server provisioning times, more efficient systems management, improved application and server availability, and greatly facilitated and improved system and application level security.

Virtualization in 2007

When HRG has spoken to IT professionals regarding virtualization technologies and their use over the past two years we have consistently heard that people are kicking the tires in most cases and are waiting for the technology and products to get into version 2, 3, and 4 releases before they make a purchase. The adoption very much resembles the adoption cycles of UNIX and even more so Linux where IT professionals took a wait and see attitude before actually diving into the deep end of the pool. Early adopters can typically be found in market segments where in spite of the risk associated with being an early adopter the competitive and revenue benefits significantly outweigh that perceived risk. CXOs and IT professionals who are considering virtualization would be well served by taking a hard look at the close relationship that HP and Novell have had for the past 20 years. This relationship has resulted in cooperative product engineering, and technology development efforts as a result of these partners' efforts to respond in a meaningful way to the stated requirements and concerns of their installed and prospective customer bases.

Today, based on primary research conducted by HRG over the past several years, even though users and vendors are saying they are using virtualization it would be more correct if instead they used the term consolidation. Anyone who has been following virtualization for any time will know that today and for the near term most IT professionals will use the virtualization capabilities being delivered through Intel, AMD, and others to consolidate work loads on to a single server or cluster at a central location. This is due in large part to cost pressures and the scarcity of affordable skill sets. The goal today for most CFOs is to take cost out of the business by reducing the number of resources that are not being used to maximum efficiency and to limit the number of personnel required to either administer or manage those resources. The net effect is an overall increase in available capital and human resource efficiency delivered through cost savings.

Back to the Future?

Cost containment - buying higher power servers - consolidating workloads onto a single rack, cluster, or data center so that they can be managed more effectively from an operational and environmental perspective. The future in this regard looks very much like the 1970s when data centers were dominant and centralized data center operations and control were accepted best practices.

Cost management

A key aspect of cost management is effectively managing your infrastructure so that you can repurpose existing dollars more effectively, with the net effect being to increase the utility of existing budgets, thereby getting more productivity out of the budget that is already in place. The net effect of this is the equivalent of a budgetary increase. Server Virtualization, consolidation, more efficient implementation, and more effective management and

administration are all key contributors to this type of strategic approach to solving the problem of doing more with less. This in a nut shell describes the reality that most CIOs and IT managers have to deal with on a daily basis and in turn sets the stage for the solution set that HP and Novell offer through the combination of SUSE Linux Enterprise Server 10, HP ProLiant, and HP Integrity servers.

The HP / Novell Partnership

HP and Novell have a unique and tightly integrated collaborative relationship that has developed and grown over the past 20 years. The relation between HP and Novell is based on openness and an understanding of the SUSE Linux Enterprise Server 10 and HP Server offerings by both sides and how they individually and together deliver value to the end user. HP and Novell are engaged in on going multi-level discussions involving general management, engineering, marketing and sales regarding ways to enhance customer experience by addressing the customer's stated requirements through the features and functions of the solution offering. HP and Novell are cooperatively focused on offering customer choice and ensuring customer satisfaction.

The partnership between HP and Novell is focused on addressing the challenges that customers face. HP is focused on delivering low cost, high performance, and high value hardware. Novell is focused on providing the software platform that enables native HP hardware capabilities to manifest themselves in order to run customer applications in a predictable and satisfactory manner.

HP Partners:

Novell and Microsoft

The relationship between Microsoft and Novell is based on technology and marketing collaboration in the following areas: virtualization, identity federation, server management with web services standards, and document format compatibility (on the desktop side). The goal for virtualization is to make sure that Windows and SUSE Linux Enterprise Server 10 can be virtualized on one another with no noticeable impact on performance. These vendors are collaborating to provide virtualization drivers that allow Windows to be virtualized on SUSE Linux Enterprise Server. They are developing paravirtualized device drivers to allow Windows to run in a fully virtualized mode unmodified with complimentary paravirtualized drivers providing the levels of performance required in production environments. Novell and Microsoft are working to ensure that Windows server 2003 as well as Longhorn (when that becomes available) can be virtualized and can virtualize SUSE Linux Enterprise Server so that customers will have the required performance levels to support production environment use for either combination.

With the release of SUSE Linux Enterprise Server 10 SP1 Novell offers a bundle of para-virtualized network, bus and block device drivers that enable unmodified Windows and Linux guest operating systems to run near native performance in virtual environments created with Xen technology integrated in SUSE Linux Enterprise Server. According to Novell these drivers bring performance enhancements to a range of virtualized workloads delivering on the commitment to customer choice by providing increased flexibility and enabling them to run legacy applications on new more powerful energy-efficient platforms from HP.

Delivering value to the customer through promoting customer choice is a key element in the relationship between Microsoft, Novell, and HP. The customer can now have the solution they want with the confidence that the solution will work as advertised because of the close relationship between Novell, HP, and Microsoft. Now customers do not have to be concerned with interoperability and are free to focus on solving business problems and driving revenue. With Novell's evolving relationship with Microsoft and with HP's established Microsoft and Novell relationships this combination of Novell, HP, and Microsoft uniquely addresses the needs and concerns of the market in ways that previously were not possible.

Novell, AMD, and Intel

Novell has strong relationships with both Intel and AMD. Novell, HP, Intel and AMD work closely to ensure that SUSE Linux Enterprise Server 10 runs well on AMD/Intel chip sets and that these are optimized and supported for the benefit of their joint customers. Novell and HP have been working closely with both AMD and Intel to make sure that the SUSE Linux Enterprise Server 10 SP1 and the HP hardware take full advantage of the latest chip

technology innovations and processor technology. Virtual environments created with Xen hypervisor technology integrated in SUSE Linux Enterprise Server 10 exploit the benefits of Intel Virtualization Technology (VT) and AMD Virtualization hardware. HP hardware utilizes either Intel® or AMD™ processors. When a customer makes a processor choice for an HP platform they know that they are going to get the performance and capabilities they expect based on what has been implemented by either vendor. Novell and HP will continue to support the latest chip set innovations for virtualization as embodied in Intel's VT and AMD's Virtualization offerings.

Novell, and AMD

The AMD and Novell relationship is unique. AMD has outsourced most of their Linux related development to the Novell's SUSE Linux Enterprise engineering team. AMD and Novell have a history of more than 5 years of engineering collaboration between the two companies. Novell has always been the first OS that has supported the technologies that AMD releases - this first to market position typically gives Novell an 8 to 15 month advantage over most other Operating Systems. When AMD v launched in 2006 Novell launched SUSE Linux Enterprise Server 10 and it was the only Operating System that took advantage of the AMD technology. With the launch of Barcelona their native quad core product SUSE Linux Enterprise Server 10 SP1 is once again the first and only shipping OS to support all of AMD's features. Novell is the launch platform of choice for AMD as cited by AMD on a number of occasions. Novell and AMD closely coordinated their efforts with HP in preparation for the native quad core announcement and release by AMD. Novell is planning with AMD and HP to do benchmarking of SUSE Linux Enterprise Server 10 SP1 on HP hardware. There is significant advantage for Novell in maintaining such a relationship with a chip manufacturer and platform partner such as AMD and HP.

Certification and Validation

Leveraging the virtualization capabilities of SUSE Linux Enterprise Server 10 SP1 and the value delivered through the Novell Validated Suite the HP / Novell partnership does a good job of meeting customer solution requirements for commercial and high performance computing (HPC) platforms.

HP and Novell have weekly calls where they bring their engineers together and in addition they have quarterly team meetings attended by the top engineers from each company. The engineering resources of both companies are available to address problems and issues as they arise. These engineering teams test products before they go to market to ensure they meet customer expectations. The engineering, quality assurance, and product support organizations of each company maintain regular contact in order to support this partnership.

HP and Novell have established an internal forum whose major objectives are to accelerate the maturity/stability of the Xen technology and to improve the general acceptance of virtualization solutions from HP and Novell. Progress has been made in the area of stabilizing Xen technology through testing performed in HP labs on a regular basis. Any problems found were formally entered into the Novell tracking systems and actively worked by Novell engineers. The joint forum is unique and has proven to be very successful in uncovering the root causes of problems and resolving problems in order to deliver advanced server virtualization support for their customers.

SUSE Linux Enterprise Server 10 SP1 contains the latest update to the Xen hypervisor (version 3.04.++). This release brings additional support for virtualization. HP has stated that they have certified and fully support SUSE Linux Enterprise Server 10 on HP ProLiant and Integrity servers. With the release of SUSE Linux Enterprise Server 10 SP1 HP has qualified Xen on select HP ProLiant servers. Furthermore HP has told HRG that stress testing of Xen as implemented in SUSE Linux Enterprise Server 10 SP1 is on going.

The benefit of certification and validation for HP and Novell customers is that both vendors stand squarely behind the offering if there are problems. This certification process is not just a rubber stamp - it actually results in collaboration between the two testing organizations in uncovering potential issues and addressing them both in the hardware and software and then delivering to the customer a product that has been rigorously tested.

HP and Novell, through the Novell Validated Configuration Program (VCP) offer Linux Cluster HPC solutions including: Electronic Design, Automation, Financial Services Life Sciences, Manufacturing, Computer Aided Engineering, and Oil & Gas. The business partners that are participating in this effort are: HP (Integrity and ProLiant servers and storage), Novell (SUSE LINUX Enterprise Server), Scali (Scali Manage/MPI Connect), Altair (PBS Pro), HP/PolyServe (Matrix Server and Cluster Volume Manager), DataSynapse (GRIDServer), United

Devices (GRID MP), and Axceleon (Enfusion). In addition Portland Group and Pathscale Compilers have been utilized thru the Novell Validation Suite test process. HP and Novell claim that these components have been tested, and certified to work “as advertised” on SUSE Linux Enterprise Server and HP's ProLiant and Integrity platform offerings.

Customer Experience

Customers have come to expect that the combination of HP hardware and Novell's operating systems, in this case SUSE Linux Enterprise Server 10, will work as advertised. When a customer puts the disk in to do an install they expect that HP's drivers have already been made available and that the install process occurs seamlessly. HP works with Novell prior to the release of each new OS to ensure that users will have that experience. HP has been involved as testers and as co-developers with Novell (they are not writing code) for each release before it hits the market. One thing that Novell does with HP and all it's OEM partners is to solicit requests for features that each OEM would like to see included in an upcoming release (technologies that the OEM's customers are asking for). Feature requests are typically based on customer demand or new hardware technology. One example is iLo or Integrated Lights Out - HP's remote system management console. iLO remote console gives users access to the Linux serial tty console. iLO scriptable virtual media lets users mount virtual file systems from a centralized virtual media server. Remote or Lights Out systems and data center management is a key tool for containing and reducing IT related costs.

Management and System Administration

One of the strengths of SUSE Linux Enterprise Server has always been in the management of the platform. With their YaST management tool, Novell has a single integrated approach to managing the system and that applies to Xen. Novell recognizes that there might be some new management scenarios when customers virtualize that may not be addressed with the Novell YaST tool. Some of the Novell ZenWorks[®] tools, like Zen Orchestrator will help address specific challenges that are likely to arise in the data center when implementing virtualization. Novell has a good understanding of what the customer is going to be facing in terms of management and Novell is working these issues through both the base operating system and complimentary solutions to add enhanced value to the HP hardware and the Novell/Microsoft software combination.

The management tools that Novell offers to the administrator allow customers to use existing systems administrator skill sets much more effectively than was previously possible. With the Novell YaST tool set they offer a GUI that is reasonably intuitive for users with some basic level of experience and requires significantly less special training than other comparable Linux command line driven systems.

- ✍️ **YaST** is an installation and system management tool that guides a user through the installation of SUSE Linux Enterprise Server and automatically detects the available hardware and facilitates right sizing of existing Windows installs. Using YaST Internet connections, the graphical interface, and security settings, can be configured as well as printers, scanners and other peripherals. YaST is a tool for automated Installation, configuration, and Administration of SUSE Linux Enterprise Server.
- ✍️ **Auto YaST** is a tool that supports automated and unattended installation. Using this tool you can create a consistent baseline configuration (golden image) for new installations. YaST online update capabilities are based on Novell ZENworks and can be used to automatically or on demand install patches, updates, and bug fixes. ZENworks Linux Management update manager, when combined with ZENworks Linux Management Server, lets Administrators centrally manage updates for remote servers / sites.
- ✍️ **The Novell Customer Center portal** provides a single point for managing all business and technical interactions with Novell such as service contracts and software licenses.

Security

There are always new exploits being written and released as hackers, crackers, and malicious kiddies (neophyte hackers) are continually trying to crack their way into database, servers, and operating environments in order to steal data, deface web sites, or just to be able to prove that they have been there (hacked into the system).

The general consensus is that Linux is a very secure operating system. However just having a well hardened operating system was just not enough for Novell. A key aspect of the Novell security story is the use of an application-level firewall technology developed by Novell and included with SUSE Linux Enterprise Server 10 that is called AppArmor. AppArmor in combination with SUSE Linux Enterprise Server 10 provides a level of security that is the functional equivalent of SELinux, which was developed, with government use in mind - You get SE Linux type features and functionality without the complexity that SE Linux has. AppArmor is easier to implement, maintain and administer than SE Linux. AppArmor provides a base tool set from which administrators can increase security through the implementation of security best practices without adding additional security administrators or having to deal with the complexities of other Linux based security offerings such as SE Linux. AppArmor provides one additional benefit for channel sales from HP and Novell because it allows Value Added Resellers (VARs) to implement higher levels of security and therefore add value for their customers. This helps channel partners deliver more value without increasing cost to the end customer.

Cost management is not just about cost reduction, cost management is about taking the available dollars and focusing on the areas of growth and innovation that best serve the organization. If customers can limit their security related costs by using a solution such as AppArmor (the application security module contained in SUSE Linux Enterprise Server) and leverage existing administrators, without having to add special skill sets, then the net effect is cost reduction or at the least cost containment. The dollars saved can then be reinvested in the development of new IT based business offerings to drive increased value and revenue.

HP c-Class and p-Class Blades

HP c-Class and p-class blade systems in conjunction with SUSE Linux Enterprise Server 10 effectively address many of today's environmental and infrastructure concerns and constraints. The new c-class blade is the next step in the evolution of HP's blade system offerings and provides improvements in rack density, compute power, and cooling requirements. HP reports that AMD has realized a performance-per-watt increase of up to 30 percent with the new HP Blade System c-Class server as compared to standard rack-mounted servers. The HP Blade System c-Class with AMD Opteron processors and AMD's Direct Connect Architecture delivers improvements in power and cooling, management and virtualization. The new c-Class Blade uses HP Thermal Logic Technologies to apply thermal controls without impacting performance. This according to HP can result in a 17 percent reduction in electricity use as compared to previous generation blade systems. Further more HP's Insight Control Management reportedly is capable of achieving a 200:1 device-to-administrator ratio by integrating system management tools from HP with the HP Blade System infrastructure. In addition to these recent advances HP's Virtual Connect Architecture allows customers to wire just once simplifying operations between domains and eliminating many previous barriers to change. HP offers 64-bit industry standard Intel® Itanium®, Intel Xeon™, and AMD Opteron,

HP Integrity Superdome

Novell offers SUSE Linux Enterprise Server 10 for HP's Integrity Superdome server that is well known for its scale up capabilities. In the fall of 2006 HP did some testing on this system and through HP's testing of SUSE Linux Enterprise Server 10 on Superdome HP discovered that there was a boot up time of around 45 minutes. According to Novell due to the open lines of communications between HP and Novell they were able to very quickly make modifications to the Linux Kernel in SUSE Linux Enterprise Server 10 SP 1 to fix that issue and bring this down to a normal Superdome boot time and ensure a satisfactory customer experience. SUSE Linux Enterprise Server 10 SP1 is the only enterprise OS that offers the level of support required for HP's Integrity Superdome. Increasingly HP customers who are running UNIX are migrating to Linux and in particular to SUSE Linux Enterprise.

HP HPC

One key area of strength for Novell that derives from the HP relationship is around AMD and Intel based HP ProLiant servers. This is the area where Novell has seen the most collaboration and made the most gain. Regarding HP's HPC solutions specifically, SUSE Linux Enterprise Server is perceived by many customers as the leading enterprise Linux distribution. Novell has the most recent versions of the drivers and the most recent versions of the technologies to support HP's HPC initiatives on their ProLiant and Integrity servers.

The price/performance advantages of industry standard clusters is driving the expansion of the HPC marketplace as companies that previously could not afford HPC can now buy-in and realize significant improvements in their overall productivity and product quality. No longer is this a market populated by scientists, researchers and programmers supporting them, but now the entire technical and commercial computing community can afford this technology and are clamoring not only for the development tools and utilities to create their own application solutions but the traditional application suites grown out of university and academic development projects are becoming commercial (not free) applications as the grad students and developers who created these new age applications are moving into the commercial sector. Today most top HPC application providers have ported their applications from UNIX to Linux and are now porting to Windows as they look for sustainable competitive advantage. Linux still dominates market segments such as financial services, pharmaceuticals, geophysics (oil/gas), semi-conductors, and automotive and aerospace industries where competition is fiercest and technology based competitive advantage is key.

One significant obstacle to wide spread HPC Cluster use has been cluster management. Today, a number of manufacturers and Independent Software Vendors (ISVs) like HP and Novell provide HPC cluster management solutions for clusters ranging from hundreds to thousands of nodes. There are also open source products that meet this challenge with varying degrees of functionality.

Over the past five years, industry standard servers have changed the HPTC landscape from proprietary systems increasingly to open software and Linux based solutions such as those provided by HP and Novell.

HPC Cluster Services

HP's deep experience in servicing systems, networks, clusters, storage devices, and software for HPC deployments and environments help ensure the service coverage and the level of expert assistance customers expect. HP HPC consultants have experience and expertise in algorithms, numerical methods, and the use and implementation of HPC solutions such as climate modeling, computational chemistry and materials science, CFD, computational structural mechanics, financial modeling, forces modeling and simulation/C4I, geographic information systems, life sciences (including Bioinformatics), reservoir modeling and seismic analysis, signal and image processing and simulation- based design, virtual prototyping, and virtual manufacturing. The HP Cluster Platform (CP) 3000BL and 4000BL can be used in conjunction with HP's Blade System c-Class for HPC-optimized configurations.

SUSE Linux Enterprise Server 10 and HP's Cluster Platforms

Novell SUSE Linux Enterprise Server 10 provides 64-bit support on AMD Opteron and Intel Xeon clusters. SUSE Linux Enterprise Server 10 is available through HP for use on HP's Cluster Platform (CP) 3000, 3000BL, 4000, 4000BL, 6000, and 6000BL offerings for HPC. HP's Cluster Platforms support enterprise Linux distributions from Red Hat and Novell as well as Microsoft Windows 2003 Server for installation on the Cluster Head or Control Nodes. HP has also negotiated special High Performance Computing bundles from Red Hat, Novell, and Microsoft Windows Server 2003 for HPC base operating systems support for Cluster Compute nodes.

HP ProLiant and Integrity servers are excellent platform choices for SUSE Linux Enterprise Server, Novell Open Enterprise Server, or Novell NetWare. HP servers deliver reliability, performance, scalability, availability, and manageability features customers require. HP has made SUSE Linux Enterprise Server 10 available for sale with its ProLiant and Integrity blades and servers (*see table below*). Any of the SUSE Linux Enterprise Server offerings from HP can be purchased with an HP ProLiant or Integrity blade or server or as a standalone product. Regarding High Performance Computing with the release of SUSE Linux Enterprise Server 10 SP1 it will now be possible to run parallelized application workloads on virtual machines and administer the virtual HPC environment through Novell's YaST GUI.

HP and Novell Support

Support and certifications listed for the HP servers and SUSE Linux Enterprise Server in the follow matrix do not necessarily apply to all model configurations. Please contact HP to obtain more detailed product and certification information. The following terms as defined are provided as a guide to using the following matrix.

- ✂✂**Tested:** The specific server has been tested for the specific version of SUSE Linux Enterprise Server
- ✂✂**Tested and supported = Supported:** The specific server has been tested and is supported by HP for the specific version of SUSE Linux Enterprise Server.
- ✂✂**Tested, supported, and certified = Certified** The specific server has been tested, is supported by HP, and is certified by Novell for the specific version of SUSE Linux Enterprise Server.

HP ProLiant Servers

BL series	» SLES 10 ¹			» OES ³	» SLES 9 ⁴	
	x86	AMD64/ EM64T	XEN ^{2,3}	x86	x86	AMD64/ EM64T
BL20p G4	Certified	Certified	Certified	Certified	Certified	Certified
BL25p G2	Certified	Certified	Certified	Certified	Certified	Certified
BL35p	Certified	Certified		Certified	Certified	Certified
BL45p G2	Certified	Certified	Certified	Certified	Certified	Certified
BL460c	Certified	Certified	Certified	Certified	Certified	Certified
BL465c	Certified	Certified		Certified	Certified	Certified
BL480c	Certified	Certified	Certified	Certified	Certified	Certified
BL680c G5	supported	supported	supported	supported	supported	supported
BL685c	Certified	Certified	Certified	Certified	Certified	Certified
DL series	» SLES 10 ¹			» OES ³	» SLES 9 ⁴	
	x86	AMD64/ EM64T	XEN ^{2,3}	x86	x86	AMD64/ EM64T
DL140 G3	Certified	Certified		Certified	Certified	Certified
DL145 G2	Supported	supported		Certified	Certified	Certified
DL145 G3	Certified	Certified		supported	supported	supported
DL320 G4	Certified	Certified		Certified	Certified	Certified
DL320 G5	Certified	Certified		Certified	Certified	Certified
DL320s	Certified	Certified		Certified	Certified	Certified
DL360 G4p	Certified	Certified		Certified	Certified	Certified
DL360 G5	Certified	Certified		Certified	Certified	Certified
DL365	Certified	Certified	Certified	Certified	Certified	Certified
DL380 G5	Certified	Certified	Certified	Certified	Certified	Certified
DL385	Certified	Certified		Certified	Certified	Certified
DL385 G2	Certified	Certified	Certified	Certified	Certified	Certified
DL580 G3	Certified	Certified		Certified	Certified	Certified
DL580 G4	Certified	Certified	Certified	Certified	Certified	Certified
DL580 G5	supported	supported	supported	supported	supported	supported
DL585	Certified	Certified		Certified	Certified	Certified
DL585 G2	Certified	Certified	Certified	Certified	Certified	Certified
ML series	» SLES 10 ¹			» OES ³	» SLES 9 ⁴	
	x86	AMD64/ EM64T	XEN ^{2,3}	x86	x86	AMD64/ EM64T
ML110G3	supported	supported		Certified	Certified	Certified
ML110G4	supported	supported		Certified	Certified	Certified
ML115	Certified	Certified		supported	supported	supported
ML150G3	supported	supported		Certified	Certified	Certified
ML310G3	Certified	Certified		Certified	Certified	Certified
ML310G 4	Certified	Certified		Certified	Certified	Certified
ML350G5	Certified	Certified		Certified	Certified	Certified
ML370G5	Certified	Certified	Certified	Certified	Certified	Certified
ML570G3	Certified	Certified		Certified	Certified	Certified
ML570G 4	Certified	Certified	Certified	Certified	Certified	Certified

XEN² SLES 10 XEN = HP supports SLES10 XEN as a technology preview for early adopters. HP has certified and will support these servers with the following caveats: no SAN support, no HP agent support, and Para-virtualized SLES10 guest OS support only in all three XEN kernels - <http://welcome.hp.com/mp/bullet.hp.cil>

XEN³ HP certified SLES 10 SP1 XEN using Novell's para-virtualized drivers available in Novell's SUSE Linux Enterprise Virtual Machine Driver Pack - <http://www.novell.com/products/vmdriverpack/> - HP strongly recommends using Novell's para-virtualized drivers with XEN. HP has certified and will support these servers with the following caveats: no SAN support, and no HP agent support

HP Integrity Servers

Entry level servers	SUSE Linux Enterprise Server (SLES)		
	SLES 10	SLES 9	SLES 8
bl860c (dual core)	Certified		
rx1620	Certified	Certified	
rx2600		Certified	Certified
rx2620 (single core)	Certified	Certified	
rx2620 (dual core)	Certified	Certified	
rx2660 (dual core)	Certified		
rx3600 (dual core)	Certified		
rx4640 (single core)	Certified	Certified	Certified
rx4640 (dual core)	Certified	Certified	
rx6600 (dual core)	Certified		
Mid-range servers	SLES 10	SLES 9	SLES 8
rx7620	Certified	Certified	
rx7640 (dual core)	Certified		
rx8620	Certified	Certified	
rx8640 (dual core)	Certified		
High-end servers	SLES 10	SLES 9	SLES 8
Superdome (single core)	Certified	Certified	
Superdome (dual core)	Certified		

Conclusion and Recommendations

Leveraging SUSE Linux Enterprise Server 10 SP1 virtualization capabilities and the value delivered through the Novell Validated Suite. The HP / Novell partnership does a good job of meeting customer solution requirements for commercial and high performance computing (HPC) platforms.

The benefit of certification and validation is delivered to HP and Novell customers through this partnership. Novell simplifies virtualization technology - providing installation, configuration and administration integration to the SUSE Linux Enterprise platform. HP and Novell, through the Novell Validated Configuration Program (VCP) offer Linux Cluster HPC solutions including: Electronic Design, Automation, Financial Services Life Sciences, Manufacturing, Computer Aided Engineering, and Oil & Gas. HP and Novell claim that these components have been tested, and certified to work “as advertised” on SUSE Linux Enterprise Server and HP's ProLiant and Integrity platforms.

Novell has strong relationships with both Intel and AMD. Novell and HP have been working closely with both AMD and Intel to make sure that SUSE Linux Enterprise Server and the HP hardware take full advantage of the latest chip technology innovations and processor technology. Virtual environments created with Xen hypervisor technology integrated in SUSE Linux Enterprise Server exploit the benefits of Intel Virtualization Technology (VT) and AMD Virtualization hardware. HP offers servers utilizing both Intel[®] and AMD[™] processors.

Server virtualization, cluster virtualization, site virtualization, and enterprise virtualization each hold out the promise of delivering extreme benefits in terms of cost reduction, flexibility, agility, and productivity improvements.

Now with the release of SUSE Linux Enterprise Server 10 SP1 HRG expects to see Novell deliver substantially on the promise of a fully functional virtualized enterprise ready Linux with fully available support for Windows running on Linux or Linux running on Windows. SUSE Linux Enterprise Server 10 SP1 and Xen virtualization technology help data center managers treat all the AMD and Intel hardware and Novell and certified ISV software in the datacenter as a pool of interchangeable resource components.

Leveraging the virtualization capabilities of SUSE Linux Enterprise Server 10 SP1 and the value delivered through the Novell Validated Suite the HP / Novell partnership does a good job of meeting customer solution requirements for commercial and high performance computing (HPC) platforms.

HRG recommends that the combination of SUSE Linux Enterprise Server and HP servers be included in any business critical Linux and AMD/Intel server and/or cluster purchase decision process. HP and Novell are cooperatively focused on, and committed to, providing and supporting chip, system (cluster or stand alone server), and solution choice as a means to ensuring customer satisfaction.

Harvard Research Group is an information technology market research and consulting company. The company provides highly focused market research, consulting services, and business modeling tools to vendors and users of computer hardware, software, and services. For more information contact Harvard Research Group as follows:

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